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# CLIMATE CHANGE MITIGATION STRATEGIES

Prepared by Carry Porter for the IWG meeting on July 8, 2008

## I. What Other Jurisdictions are Doing

### A. Massachusetts

In April 2007, Massachusetts became the first state to require state agencies and private developers to assess greenhouse gas (GHG) emissions in their environmental review documents.[1] Massachusetts's policy requires developers to identify measures to avoid, minimize, or mitigate GHG emissions associated with their projects in environmental impact reports (EIRs) prepared under the Massachusetts Environmental Policy Act (MEPA).[2] The state provides a list of suggested mitigation strategies in its MEPA Greenhouse Gas Emissions Policy and Protocol.

### B. California

In August 2007, California passed Senate Bill 97, amending the California Environmental Quality Act (CEQA) to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for analysis under CEQA. It directs the Governor's Office of Planning and Research (OPR) to develop draft CEQA guidelines for the mitigation for the effects of greenhouse gas emissions by July 2009 and directs the Resources Agency to certify and adopt the CEQA guidelines by January 2010.

In the meantime, the California Air Pollution Control Officers Association (CAPCOA), an association of air pollution control officers representing 35 local air quality agencies, in partnership with EDAW, a California-based architecture and environment consulting firm, performed a global search of mitigation measures currently in practice and under study that would reduce GHG emissions. The company analyzed each measure by its economic, technological and logistical feasibility, its emission reduction effectiveness, and its potential for

[1] Massachusetts Executive Office of Energy and Environmental Affairs, MEPA Greenhouse Gas Emissions Policy and Protocol (Apr. 23, 2007), *available at* http://www.mass.gov/envir/mepa/pdffiles/misc/ghgemissionspolicy.pdf.
[2] MEPA is found at Mass. Gen. Laws, ch. 30, § 61, *et. seq.*

secondary impacts on air quality. The results of the study are included in a white paper – CEQA & Climate Change – published by CAPCOA in January 2008.[3]

### C. King County

In October 2007, King County Executive Ron Sims signed an executive order mandating the evaluation of climate change impacts under SEPA.[4] The county issued a worksheet for calculating GHG emissions[5] and is currently developing an ordinance to implement a proposed policy that would allow King County to exercise substantive authority under SEPA to condition or deny proposals that would have a significant, adverse impact on the environment due to their greenhouse gas emissions.[6]

It does not appear that King County has created a specific list of mitigation strategies for use in the SEPA process. It has, however, created a Global Warming Action Plan, detailing how the county plans to reduce its GHG emissions and anticipate and adapt to projected climate change impacts.[7]

## II. Mitigation Strategies

### A. Preferred Practice

Each jurisdiction applies the principle of mitigation sequencing. Preference is given first to measures that will avoid emissions, then to measures that will reduce emissions, and only then to measures that compensate for emissions through off-sets or similar provisions.

Massachusetts's Greenhouse Gas Emissions Policy and Protocol, for example, states that "while it is MEPA's policy to encourage proponents to avoid or minimize GHG emissions on-site, EEA will also be receptive to proposals to mitigate such emissions through off-site measures when avoidance or minimization strategies are not feasible." [8] King County's draft SEPA Climate

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[3] CAPCOA, CEQA & Climate Change (2008), *available at* http://www.capcoa.org/ceqa/CAPCOA%20White%20Paper%20-%20CEQA%20and%20Climate%20Change.pdf. See pages 79-87 and Appendix B for mitigation-related information.

[4] King County, Exec. Order No. PUT 7-10 (2007), *available at* http://www.kingcounty.gov/operations/policies/executive/utilitiesaeo/put7101aeo.aspx.

[5] The worksheet is available as a fill-in Excel spreadsheet (http://www.metrokc.gov/ddes/forms/SEPA-GHG-EmissionsWorksheet-Bulletin26.xls) or in PDF format (http://www.metrokc.gov/ddes/forms/SEPA-GHG-EmissionsWorksheet-Bulletin26.pdf).

[6] Draft King County SEPA Climate Change Ordinance (Apr 30, 2008), *available at* http://www.metrokc.gov/permits/codes/ pdf/PubComment08May-SEPA-GHG-Ord080430-1.pdf.

[7] King County's Global Warming Action Plan is available at http://www.metrokc.gov/exec/news/2007/0207warming.aspx.

[8] Massachusetts Executive Office of Energy and Environmental Affairs, *supra*.

Change Ordinance includes mitigation sequencing language in Section 1.[9] CAPCOA also recommends an abatement strategy that first avoids, then minimizes, and finally compensates for impacts.[10]

### B. Types of Mitigation

Mitigation practices are grouped into several overarching categories, such as site design, building design and operation, and transportation. See the list (below) for a compilation of specific measures by category.

As you will see, the recurring theme that echoes throughout a majority of the mitigation measures is the shift toward New Urbanism. New Urbanism (also called Traditional Neighborhood Design and Neo-Traditional Neighborhood Design) is a town planning principle that has gained acceptance in recent years as being one solution to a variety of problems in suburban communities throughout the country. Traditional neighborhoods are more compact communities designed to encourage bicycling and walking for short trips by providing destinations close to home and work and by providing sidewalks and a pleasant environment for walking and biking. These neighborhoods are reminiscent of 18th and 19th century American and European towns, along with modern considerations for the automobile.

### C. Measuring Effectiveness

The comprehensive approach to mitigation makes it challenging to assess the effectiveness of a single mitigation measure or strategy. CAPCOA is the only organization within the three jurisdictions that has attempted to qualify the effectiveness of various mitigation measures. The organization's white paper noted that there is a strong interrelationship between many of the measures, which justifies a combined approach.[11] Consider, for example, the relationship between bike parking nonresidential, bike parking residential, end trip facilities, and proximity to bike path/bike lane measures. In reality, these measures combined act as incentives for one individual to bike to work, while implementation of a single measure without the others reduces effectiveness.

[9] Draft King County SEPA Climate Change Ordinance, *supra.*
[10] CAPCOA, *supra* at 79.
[11] CAPCOA, *supra* at 79 and Appendix B.

## III. Questions that the IWG may address regarding mitigation

What is the recommended threshold for lead agencies to require mitigation for climate change impacts?

If mitigation measures are adopted, how should effectiveness and compliance be monitored and enforced?

Should the IWG recommend sequencing of mitigation as other jurisdictions have done?

Should the IWG encourage some types of mitigation and discourage others?

If offsets are an allowable type of mitigation, can offsets be purchased from anywhere in the world or only nearby?

How much mitigation is enough to reduce a project's impact so it is not significant?

Should the IWG focus exclusively on mitigation measures under substantive SEPA authority or develop recommendations that can be used for a MDNS?

## Mitigation Strategies

Following is a list of recommended mitigation strategies collected from Massachusetts's Executive Office of Energy and Environmental Affairs (EEA)[12] and the Governor's Office of Planning and Research (OPR) in California.[13]

Briony Angus, MEPA analyst with EEA,[14] indicated that EEA would be releasing a narrow list of mitigation measures in the near future. The new list will eliminate many of the green design principles, because many developers are already including these in their building design plans. It will be limited to direct and easily quantifiable mitigation measures. To receive notification of the updated list, you can subscribe to *The Environmental Monitor*, a twice monthly electronic newsletter with information on projects under review, recent decisions of the Secretary of Environmental Affairs, and public notices from environmental agencies. Requests to be placed on the electronic mailing list should be sent to mepa@state.ma.us. Please include your e-mail address, your name and an alternative means of contacting you (phone number or address).

### Site Design

- Provide permanent protection for open space on the project site.
- Conserve and restore natural areas on-site.
- Plant trees and vegetation near structures to shade buildings and reduce energy requirements for heating/cooling.
- Preserve or replace onsite trees (that are removed due to development) as a means of providing carbon storage.
- Minimize building footprint.
- Design project to support alternative transportation to site including transit, walking, and bicycling.
- Use low impact development for stormwater design.
- Design water efficient landscaping.
- Minimize energy use through building orientation.
- Encourage infill, redevelopment, and higher density development, whether in incorporated or unincorporated settings.

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[12] Massachusetts Executive Office of Energy and Environmental Affairs, *supra* at 9-10.
[13] Governor's Office of Planning and Research, CEQA and Climate Change Technical Advisory, 18-20 (2008), *available at* http://www.opr.ca.gov/download.php?dl=ceqa/pdfs/june08-ceqa.pdf.
[14] Briony Angus can be contacted by phone at 617-626-1029 or by email at briony.angus@state.ma.us.

**Building Design and Operation**

- Encourage public and private construction of LEED (Leadership in Energy and Environmental Design) certified (or equivalent) buildings.
- Purchase Energy Star equipment and appliances for public agency use.
- Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.
- Construct green roofs.
- Use high-albedo roofing materials.
- Install high-efficiency HVAC systems.
- Eliminate or reduce use of refrigerants in HVAC systems.
- Reduce energy demand using peak shaving or load shifting strategies.
- Maximize interior day lighting through floor plates, increased building perimeter and use of skylights, celestories and light wells.
- Incorporate window glazing to balance and optimize day lighting, heat loss, and solar heat gain performance.
- Incorporate super insulation to minimize heat loss.
- Incorporate motion sensors and lighting and climate control.
- Use efficient, directed exterior lighting.
- Incorporate on-site renewable energy sources into project including solar, wind, geothermal, low-impact hydro, biomass, and bio-gas strategies.
- Incorporate combined heat and power (CHP) technologies.
- Use water conserving fixtures that exceed building code requirements.
- Re-use gray water and/or collect and re-use rainwater.
- Provide for storage and collection of recyclables (including paper, corrugated cardboard, glass, plastic, and metals) in building design.
- Re-use building materials and products.
- Use building materials with recycled content.
- Use building materials that are extracted and/or manufactured within the region.
- Use rapidly renewable building materials.
- Use wood that is certified in accordance with the Forestry Stewardship Council's Principles and Criteria.
- Use low-VOC adhesives, sealants, paints, carpets, and wood.
- Conduct 3rd party building commissioning to ensure energy performance.
- Track energy performance of building and develop strategy to maintain efficiency.
- Provide construction and design guidelines to facilitate sustainable design for build-out by tenants.

**Transportation**

- Locate new buildings in or near areas designated for transit-oriented development (TOD) and, where possible, incorporate TOD principles in employee and customer activity patterns.
- Purchase alternative fuel and/or fuel efficient vehicles for fleet.
- Where feasible, include in new buildings facilities to support the use of low/zero carbon fueled vehicles, such as the charging of electric vehicles from green electricity sources.
- Join or form a transportation management association.
- Provide new transit service or support extension/expansion of existing transit (buses, trains, shuttles, water transportation).
- Support expansion of parking at Park-n-Ride lots and/or transit stations.
- Develop or support multi-use paths to and through site.
- Size parking capacity to meet, but not exceed, local parking requirements and, where possible, seek reductions in parking supply through special permits or waivers.
- Pursue opportunities to minimize parking supply through shared parking or banked parking.
- Develop a parking management program to minimize parking requirements such as parking cash-out, parking charges, preferential carpool or vanpool parking, limiting parking available to employees.
- Develop and implement a marketing/information program that includes posting and distribution of ridesharing/transit information.
- Subsidize transit passes.
- Use of pre-tax dollars for non-single occupancy vehicle (SOV) commuting costs.
- Reduce employee trips during peak periods through alternative work schedules, telecommuting, and/or flex-time.
- Provide a guaranteed ride home program.
- Provide on-site amenities such as banks, dry cleaning, food service, childcare.
- Provide bicycle storage and showers/changing rooms.
- Traffic signalization and coordination to improve traffic flow and support pedestrian and bicycle safety.
- Replace traffic lights, street lights, and other electrical uses to energy efficient bulbs and appliances.
- Implement land use strategies to encourage jobs/housing proximity, promote transit-oriented development, and encourage high density development along transit corridors. Encourage compact, mixed-use projects, forming urban villages designed to maximize affordable housing and encourage walking, bicycling, and the use of public transit systems.

- Encourage new developments to integrate housing, civic, and retail amenities (jobs, schools, parks, shopping opportunities) to help reduce VMT resulting from discretionary automobile trips.
- Apply advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods, and services.
- Incorporate features into project design that would accommodate the supply of frequent, reliable, and convenient public transit.
- Implement street improvements that are designed to relieve pressure on a region's most congested roadways and intersections.
- Limit idling time for commercial vehicles, including delivery and construction vehicles.
- Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.
- Create an online ridesharing program that matches potential carpoolers immediately through email.
- Encourage large businesses to develop commute trip reduction plans that encourage employees who commute alone to consider alternative transportation modes.
- Develop a Safe Routes to School program that allows and promotes bicycling and walking to school.

**Energy Conservation Policies & Actions**

- Recognize and promote energy saving measures beyond Title 24 requirements for residential and commercial projects
- Educate the public, schools, other jurisdictions, professional associations, business, and industry about reducing GHG emissions.
- Execute an Energy Savings Performance Contract with a private entity to retrofit public buildings. This type of contract allows the private entity to fund all energy improvements in exchange for a share of the energy savings over a period of time.
- Design, build, and operate schools that meet the Collaborative for High Performance Schools (CHPS) best practices.
- Retrofit municipal water and wastewater systems with energy efficient motors, pumps and other equipment, and recover wastewater treatment methane for energy production.
- Convert landfill gas into energy sources for use in fueling vehicles, operating equipment, and heating buildings.
- Purchase government vehicles and buses that use alternatives fuels or technology, such as electric hybrids, biodiesel, and ethanol. Where feasible, require fleet vehicles to be low emission vehicles. Promote the use of these vehicles in the general community.

- Offer government incentives to private businesses for developing buildings with energy and water efficient features and recycled materials. The incentives can include expedited plan checks and reduced permit fees.
- Offer rebates and low-interest loans to residents that make energy-saving improvements on their homes.
- Create incentives to increase recycling and reduce generation of solid waste by residential users.
- Implement a Construction and Demolition Waste Recycling Ordinance to reduce the solid waste created by new development.
- Add residential/commercial food waste collection to existing greenwaste collection programs.
- Offer government employees financial incentives to carpool, use public transportation, or use other modes of travel for daily commutes.

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